AN ANALYSIS OF ALTERNATIVE OPERATIONAL DESIGNS
FOR AN INDUSTRIAL PARK IN THE SOUTHWEST CORRIDOR

BY

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ABSTRACT

This thesis analyzed alternative operational land use design
for a proposed industrial park site located in the inner belt
section of the Southwest Corridor. The analyses investigated
a particular use of this valuable land that will hopefully
have maximum impact on achieving the following set of community
economic development objectives in the Roxbury area:

1) To provide meaningful employment for the Roxbury
minority labor force.
2) To provide opportunities for local businesses.
3) To create assets for Circle, Inc. (a Community
Development Corporation) which it may use as
financial leverages for acquiring financing for
additional development projects.

This thesis determined that if the full development
potential of the site is to be achieved, the following
conditions must be met:

1) Both the state and local governments must provide
support through land subsidy, tax write down and
by assembling the land through eminent domain.

2) The transportation facilities in the area must
be upgraded.

This thesis further determined that through a combination
of industrial revenue bonds and Small Business Administration
LDC's financing that it will be economically feasible to
construct facilities that will accommodate both large and
small firms. It also designed an operational model which will
function to link large firms with small enterprises. This
thesis suggested that these linkages, by maximizing
agglomeration economic factors, will function to reduce
operating costs of the site's occupants.
Therefore, by locating "desirable" high wage industries on the site (which the thesis identified), along with the implementation of a manpower development and effective affirmative action program, the project will be able to provide meaningful employment for Roxbury minority labor force. By developing a means of financing facilities for small local firms and by developing an operational design model in which they will be "linked" with larger firms on the site, opportunities will have also been provided for local entrepreneurs.

Finally, to initiate the project, the thesis proposed that the state transfer 160,000 square feet of land that it owns to a local developer. The thesis also proposed that the Boston Economic Development and Industrial Corporation use its eminent domain powers to assemble the land and then designate Circle as the developer.

Thesis Supervisor: Bennett Harrison

Title: Associate Professor, Department of Urban Studies
TO BARBARA, MARK AND MARLON
Acknowledgement

I wish to thank the many contributors who, through their advise, critiques, and moral support, have made this project possible. I wish to express special thanks to my advisor, Dr. Bennett Harrison, who gave generously of his time to this endeavor. The insight and knowledge which he shared was invaluable in providing direction for me in my effort to carry this project to its completion. I also wish to express gratitude to my readers: Representative Melvin King and Professor Tunney Lee. Their guidance and critiques have been extremely valuable in the continued development of this project.

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Table of Contents

Chapter 1

Economic Development Goals.............................. 1

Chapter 2

Introduction............................................. 5
Description of the Site................................... 7
Land Cost Factors in the Site's Development Potential................. 10
Cost of Government Services.............................. 17
Its Accessibility: A Factor in Industrial Development............... 22
The Area's Physical and Social Image........................ 28
Conditions and Prerequisites Vital for Development.................. 30

Chapter 3

Introduction............................................. 36
Space Distribution....................................... 37
Development Costs Analysis................................ 39
Industrial Revenue Bonds.................................. 46
What Type of Industry?.................................. 54
Means of Financing Small Manufacturing Facilities.................. 64
Planned Economic Environment.............................. 70
Total Rental Costs........................................ 77

Chapter 4

"Wrap-Up"................................................. 85
"Start-Up"................................................. 87
Illustrations and Tables

Chapter 2

Map............................................. 8
Annual Applications for Abatement Assessing Department, City of Boston 1961-1972................................. 19
Rapid Transit Network......................... 23

Chapter 3

Space Distribution Summary.................. 37
Construction Costs for One Story Structure......................... 41
Construction Cost for Two Level Structure......................... 43
Projected Employment Potential of the Site.......................... 57
Projection of Minority Participation........... 60
One Level Facilities (for small firms)....... 66
Two Level Facilities (for small firms)....... 67
Primary Iron & Steen Transportation Costs of Transporting the Inputs from the Six Top Wage Industries....................... 82
Harrison and Vietorisz describe ghetto economic development as:
"...a tool that allows its residents to collectively attack their economic problems where isolated individual efforts could not work, and as a catalyst that will help to transform an urban slum such as Harlem from a culture of poverty to an initially poor but integrated, satisfying and organized social system". ¹

Through this paper, we hope to provide a technical tool with which a community development corporation, such as Circle, can use in its efforts to shape an economic development program for the Roxbury community. Our specific aim is to analyze ways by which a ghetto (Roxbury) economic development program may be tapped into a proposed city and state supported industrial development project. To accomplish this goal, we shall analyze alternative operational land use designs for a proposed industrial park site located in the inner belt section of the Southwest Corridor. The analyses will investigate a particular use of this valuable land that will hopefully have maximum impact on achieving the following set of community economic development objectives in the Roxbury area:

1. To Provide Meaningful Employment for the Roxbury Minority Labor Force

By "meaningful employment," we are talking about jobs that will pay high wages, that provide opportunity for on the job training and jobs that are not seasonal. We are concerned both with industrial jobs and also jobs that will be available during the construction of the industrial park.
The development should be an opportunity to train Roxbury's residents in the fields of commercial real estate development and construction. Over the next five years, over $230 million will be invested in capital improvement in Roxbury alone, not to mention the amount of investment in the entire city. The residents of Roxbury need to be prepared to take advantage of this market.

2. The second objective will be to provide opportunities for local businesses. However, we will view the development of local entrepreneurs within the context of a planned economic development program in the park. We feel that to merely plant entrepreneurial seeds into the barren ghetto soil - as the proponents of Black capitalism propose to do - is to destine them to undergrowth and ultimately to failure. The survival of local businesses, at a scale of operation that we envision, will need the support of both social and economic institutions in ghetto communities that will serve to create the necessary social infrastructure essential for economic growth. Courtney Blackman calls for the establishment of special institutions in ghetto communities that will serve as "repository of social capital." He feels that these special institutions are needed in order to "repair the capital deficit" that exists in ghetto communities. He lists three criteria for such institutions.

1. They should be efficient - that is, they should affect as many Blacks as possible.
2. They should be tuned into the national economy.

3. They should provide opportunities for Black people to gain managerial skills.

In other words, we are suggesting that planned social and economic systems must be developed within ghetto communities in which the institutional fibers that would be weaved, will integrate them into an economic, political and cultural whole, thereby creating an environment in which local businesses may grow and develop. This does not imply, however, that this thesis will be suggesting that the Roxbury community should isolate itself from the rest of society. In fact, this thesis, in its section entitled "Planned Economic Environment," will seek ways of linking larger "outside" firms with smaller local firms in ways that will enhance the economic viability of both. In other words, we will be examining the concept of a "mini-economic system" within the industrial park that would be tuned into the "outside" while aiding the economic development of Roxbury.

3. To create assets for Circle, Inc. which it may use as financial leverages for acquiring financing for additional development projects. In a very fundamental way, Circle meets Blackman's definition of "special community institutions" of which we discussed earlier. It is an agency that is engaged in comprehensive community economic development planning in Roxbury. It is also an agency that provides to local businesses such vital services as management training, venture capital investments, business consultants, etc. We will, therefore, among other things, explore the feasibility of Circle serving
as the developer. We feel that it is vitally important that
an institution that is part of the fabric of the community
be the catalyst of its development.

The above listed goals will serve as social indicators for assessing
the relative merits of the various operational design alternatives.
Chapter two of this thesis will assess the site's suitability for
industrial activities. In order to get a realistic picture of its
development potential, we will look at its good features as well as its
less desirable features. 6

The task of the third chapter will consist of examining alternative
industrial uses. In other words, what type of industrial use will be
most appropriate for meeting the economic development objectives outlined in this chapter? A number of alternatives will be explored.
Should, for instance, the property be developed for a single large "foreign" client that will produce the largest number of jobs? Or, should the facilities be developed for small local Roxbury firms? This chapter will also project development costs and within the constraints created by these projections, we will examine the development alternatives.

The final chapter of this thesis will be a "wrap-up" and "start-up"
chapter. By wrap-up, we mean that it will review the analysis and make some concluding observations. By start-up, we mean that the conclusions will point out the first steps that will have to be taken to start the development process.
Footnotes - Chapter One

1. Thomas Vietorisz and Bennett Harrison, the Economic Development of Harlem, Praeger, 1970, page 64.

2. This information was obtained through an interview that this writer had with Mr. Alex Ganz, Director of Research, Boston Redevelopment Authority.

3. Its poor economic environment is one of Brimmer's major reasons for his criticism of Black capitalism in ghetto communities. He sees the ghetto as a poor and risky environment for business investments. He points to the low median family income of ghetto residents, their limited assets, the area’s high unemployment, and low skills among the residents, as factors that make the ghetto market poor economic soil for business investments. (Source: "The Economic Potential of Black Capitalism". A paper presented by Andrew F. Brimmer, Manager of the Board of Governors of the Federal Reserve System).


5. Ibid., Blackman, page 24.

6. Although theoretically the site might be considered for activities other than manufacturing, we have concluded that other alternatives would not be a realistic consideration given that the area in which the site is located is already dominated by industrial activities. However, our examination of its industrial potential, does not preclude the possibility of planning various supportive services on the site which will function to enhance overall economic viability of the area.
Chapter 2

Introduction

The previous chapter specified some economic development goals. This chapter shall endeavor to determine the site's suitability for industrial activities. In other words, in light of the economic development goals that have been established in chapter one, is industrial development the most appropriate use of this particular site? What features of the site will make it advantageous for manufacturing firms to locate there and what features will present barriers to industrial development?

In specific terms we shall examine and analyze the following features of the site:

Land Cost. We will estimate the cost per square foot required to acquire, relocate and clear the land. Will the land cost be within a range that would make the development project feasible?

Cost of Government Services. We shall attempt to determine in this particular section, if the city's property tax will be a major deterrent or inducement to the site's development potential.

Accessibility Factor. This section will examine the transportation facilities to determine the site's accessibility to key points in the Metropolitan area.
The Physical and Social Image of the Area: This section will attempt to answer such questions as: What are the physical features of the area that will make it attractive or unattractive to industry? What are the social factors of the community that would be attractive or unattractive to industry? After all of the above features are examined, the section will summarize the findings and determine the conditions that would have to be met to make the site suitable for industrial development.
Description of the Site

The site is located adjacent to lower Roxbury and it is within the Model City boundaries. It is at the Northwest end of the Corridor, within the "inner belt" section, near the entrance to the South East Expressway.

Its boundaries encompass three blocks, beginning at the intersections of Southhampton and Massachusetts Avenue. (See Fig. 11-1).

The private land is composed of all the land in the two blocks south of Island Street and approximately half of the land area in the block to the north of Island, for a total land area of 423,676 sq. ft. Also included in this analysis is 160,000 sq. ft. of "right-of-way" (or public land) which covers roughly half of the block north of Island of the main site and all of the site's eastern extension, thus providing for a total of 583,676 sq. ft. of land that shall come under the purview of this study.

The public land is practically cleared of obstructions. The private part in the block north of Island Street also consists of cleared parcels. The most intensively occupied area, in terms of permanent structures on the site, is the block farthest south of the main land area on which is located a foundry and a laundry manufacturing company.

The site is now zoned for industrial use. Its extreme
eastern end has an "M-2" zoning, which means that restricted manufacturing is permitted and the remaining area is zoned for "I-2" activities, meaning that it accommodates a "mix" of commercial activities. Both the east and west sections are permitted to have building floor areas that are twice the land area. What this means is that a building erected, for example, on 1,000 sq. ft. of land area can have a total floor space of 2,000 sq. ft. This permits multiple level structures to be built.
Land Cost Factors in the Site's Development Potential

A crucial factor in assessing the site's development potential is the cost of acquiring and preparing the land. Dr. Andrew Hamer, in his dissertation on "Comparative Cost of Location of Manufacturing Firms in Urban Areas," asserts that cost differentials of land and government services are the determining forces in the movement of industry to the suburbs. He states:

"...land cost variations are allowed to play a commanding role in manufacturing locations, together with the price differential in the provision of governmental services to the firm. Land Price differentials exert this impact at the very time that cost advantages of the central city for most manufacturing have been largely eliminated." ¹

In 1969, The Boston Economic Development and Industrial Commission (EDIC) conducted a survey of over 300 manufacturing firms. The survey found that 44 percent of the firms were thinking of moving out of the city. Out of the top five reasons that the firms gave for wanting to move, four of them were related to their having inadequate space in their current location. The most urgent need expressed was the need for acquiring space for expansion purposes at an acceptable cost. ²

Hamer found that the cost for prime vacant land in Boston averages from $3.50 to $4.50 sq. ft. In contrast, the cost in the suburban ring around Route 128 is estimated to average from $1.15 to $1.30 sq. ft. Farther out
around Route 495 the price of land is in the even lower range of $.70 to $1.00 per sq. ft. Such price differentials, if they include land development costs, definitely place Boston in a non-competitive position.

One of the problems involved in assembling land in the city is that over time, land has become broken up into smaller and smaller parcels.

For example, in order to assemble the land on the site that we are discussing here, it will be necessary to negotiate with eight owners who share 27 parcels (with land areas that range from 1,270 sq. ft. to 71,733 sq. ft. in size) for a total site area of 423,676 sq. ft. Should one attempt to assemble the land through private means, the time and effort that would have to be invested in such a tedious process would be substantial.

The EDIC has eminent domain powers to assemble land located in areas zoned for industry. But even if the land is acquired through public means (eminent domain) the procedures are also slow and costly. To implement the acquisition process, the Corporation would still be required to purchase land at fair market value. It also would be obligated by law to directly assist the indigenous occupants in relocating. In addition to helping them to find suitable quarters for their businesses or residences, EDIC must provide financial compensation for their dislocation. The cost involved in relocating site occupants is, therefore, included in the final land cost. Thus, to acquire
the land that we are studying, in addition to reaching satisfactory agreements with each of the eight owners on fair market prices for their respective parcels, the acquiring agencies must also provide for the relocation needs of the 11 industrial, commercial and family occupants who are presently using the site either for their business or as a place of residence.

After the land has been acquired and after the occupants have been satisfactorily relocated and compensated, the land will have to be cleared and prepared before it is ready for construction, thus adding another expense item to the land cost.

Since most of the site includes the cleared Corridor right-of-way, and since a good portion of the privately owned land is being used for parking and open storage space, it is, relative to other industrial areas in the city, fairly free of obstruction. Most of the buildings are one story structures. There are 19 wood structures on the site that combine for a total of 36,350 sq. ft. of floor space. The site also has on it ten buildings made of bricks or concrete that provide a total of 55,989 sq. ft. of floor space. The total floor area covered by all the structures on the site is 92,339 sq. ft. The space covered by all of the buildings is less than 1/5 of the total site. One reason for this low building to site ratio is that the area north of Island Street includes the portion of the cleared right-of-way, a parking area
and an open storage area for commercial pipes.
The total land costs will include the sum of the following cost items:

1. The acquisition cost - that is the cost of acquiring the land from its present owners.
2. Demolition cost - the cost required to clear the land of present structures.
3. Relocation cost - to acquire the land through an eminent domain process, the law requires that the present occupant be compensated for relocation expenses.

We will first estimate the cost of acquiring the private land based on an estimate of its market value and then we will add demolition and relocation costs, which will provide us with the total land cost. We will next divide the total land cost by the total square feet of private land, thereby providing us with a total private land cost per foot. We will next add the total square feet of cleared public land (which we will assume is available at zero cost)\(^6\) to the total private land area and then divide total land cost by the total square feet of public and private land, thus giving the total land cost per foot, if the public land is included at zero cost.

Acquisition for the total private parcels of the site is estimated to cost $780,200. This estimation has been made by computing the sum of the assessed values
for all 27 parcels ($390,100) and multiplying by two. The assumption here is that the tax assessed value of the property will be on the average, half of its fair market value.

Based on the above projection, it would cost $1.84 sq. ft. to acquire 423,676 sq. ft. of private land. However, if 160,000 sq. ft. of public owned land, at zero cost, is included in this projection, the total site acquisition cost would drop to $1.33 sq. ft. and the total land area would go up to 583,676 sq. ft.

For estimating demolition and clearance cost we will apply a formula that is in use by EDIC and one which has been recommended by leading experts in the field. The formula is as follows:

Demolition and clearance cost: \( \frac{\text{Total sq.ft. of building area}}{7,000} \times 5,000 \)

That is, demolition cost is estimated to average $5,000 for every 7,000 sq. ft. of structure. We derive an estimate of demolition cost that is $70,000 (rounded figure). The demolition cost per sq. ft. of the private land alone, excluding the public portion, would come to $.17 for a total acquisition and clearance cost of $2.01 sq. ft. When the public land is included in the total land area, the demolition and clearance cost per sq. ft. drops to $.11 for a total acquisition and clearance cost of $1.44 sq. ft.

Finally, we come to the task of estimating the relo-
cation cost. The exercise is difficult because it requires an estimation of the cost of moving not only inventories from the present locations to new locations, but also the cost of disassembling equipment at the old site and re-assembling and installing it at new locations. Obviously, the nature and type of inventories that have to be transported varies tremendously from occupant to occupant. One would need an indepth knowledge of all the occupants' activities to be able to anticipate their individual relocation needs, problems that may be anticipated, etc., and then estimate an aggregate cost for all of these factors. Even if one did have that kind of information, one would still be handicapped because there is no way of knowing in advance where each occupant will be relocating and thereby their respective transportation costs. In essence, the relocation phase of land acquisition entails a staff that will be able to service the individual needs of the occupants as well as providing each occupant with adequate financial and technical resources. Therefore, rather than attempt to project a relocation cost per occupant, we will provide a relocation budget, which will serve as discretionary funds earmarked for relocation use and other unexpected costs.

Since EDIC has been authorized by state legislation to acquire industrial land, we will budget for each occupant $25,000 which is the maximum amount that EDIC is allowed by law to pay per occupant for relocation. As we
noted earlier, residential, industrial and commercial occupants are on the site. That means that $275,000 (11 x $25,000) will be budgeted for relocation and other expenses. Of course, by no means will each occupant be destined to receive $25,000. Rather, the $25,000 will serve as a "ceiling" under which there will be considerable variation. For instance, the cost for relocating a family will be far below the $25,000 ceiling. On the other hand, the Mechanic Foundry relocation needs might exceed the $25,000 limitation. The $275,000 that would be budgeted for relocation would raise the per sq. ft. of private land cost by $.64 to $2.65. When the free public land is included, the increase is $.46 for a total per sq. ft. total of $1.90. We might also point out here that while we budget an amount of money to cover the relocation cost for all the tenants, some of the operational designs that shall be outlined in chapter three call for maintaining at least one of the present occupants on the site.

This section has analyzed a significant cost factor in relation to the site, the cost of its land. The next section will examine another cost factor related to the site and that is the cost of government services. It will endeavor to answer the question: Will the cost of local government services (property tax) inhibit the development of the site?
Cost of Government Services

This section will analyze the effect of government service costs on the development potential of the site that we are studying. In other words, to what extent will the city's property tax be a constraint on building new facilities on the site? In the opinion of many leading businessmen, the property tax is a serious burden to the city's economic growth potential. For instance, Mr. King Upton, Vice President of the First National Bank of Boston, considers high property taxes as a major reason for the exodus of manufacturing firms from the city.8

The Boston Municipal Research Bureau, in two published research reports entitled "The Boston Property Tax I and II," alleges that the city's property tax burden is excessive and that the prolific rise of the tax levy is exceeding the expansion of the tax base. The report claims that since 1964, the levy has increased from $145.7 million to $337.5 million, an increase of 132 percent. Meanwhile, the tax base over 12 years has increased by only 17.1 percent or 2 percent per annum.9

The report further alleges that, due to the tension between the inflationary rise in the city's levy against the almost static tax base, tax assessors have tended to overevaluate properties. Not only is this practice (the report claims) unfair to the property owners, it is fiscally unsound. In the second part of its two part series, the report reviews the abatement
practices in Boston. The abatement process is a means of adjudication for property owners who have allegedly been over assessed. The number of appeals to both the Boston Assessor's Department and to the State's Appellate Tax Board have increased dramatically. (Fig. 11-2). The appeal procedures create extra liability on Boston because---in 1972 alone---an aggregate sum of $1.18 billion of tax revenue was frozen in the appeal process. The report concludes that the rising number of appeals is symptomatic of an inadequate tax base and the "patching up" efforts of the tax assessors who are desperately trying to hold the fiscal structure together by their overevaluation of property.

An opposite conclusion has been made by Andrew Hamer. He postulates that while Boston's tax rate is officially 12 percent of full property value, in reality it is closer to five percent. "Full value" or "Equalized" property tax rate is determined by the extent to which a property's assessed value reflects its market value or full value. If Hamer's conclusion is true, overevaluation is not as excessive as the Boston Municipal Research Bureau's report alleges. For instance, the sector of the site which we are examining that lies south of Island Street has an aggregate assessed value of $338,800. For each $1,000 of its assessed value the city receives $195, for a total tax revenue, coming from the properties, of $66,661.63. If the assessed values are the
Fig. II-2.
Annual Applications for Abatement
Assessing Department, City of Boston
1961-1972
same as their market values, the properties would be pay-
ing property taxes that are 19 percent of their full values. However, based on unofficial information from the Boston Tax Assessor's Department and based on estimates in use by EDIC, we project that the assessed values of the properties average one half of their market value. Based on the above projection the city is receiving an annual return of 9.5 percent on the properties' full value. (Based on unofficial information from the Tax Assessor Department, old manufacturing facilities are generally assessed at 50 percent of their full market value).

This exercise merely serves to illustrate that the extent and the nature of the property tax burden is not a very clear issue due to the nature of the assessment process. We may say, however, that the system has built-in flexibility as is evident by the extensive use of "lieu tax" provisions in the construction of office buildings, and that it would be possible - politically - to work out advantageous and competitive tax arrangements. Mr. Dan Wheeler, Vice President of Cabot, Cabot and Forbes Development Corporation, points out that industries have not moved out of the city to get away from the high real estate tax, but rather their moves have resulted from other factors. It is this writer's opinion that the city's property tax will be neither a major deterrent in the site's development nor will a "lieu tax" arrangement
be a major incentive for attracting outside firms. Some form of lieu tax mechanism that will serve to reduce their gross rental cost will be useful for aiding local firms in increasing their competitive position, but a firm's decision to locate in the new facilities will probably not be contingent upon such provisions. We have only talked about the cost of government services, we have not discussed the quality of such services. A full discussion of this matter shall be made in chapter three. After we have determined development costs, and discussed various "on-site" industrial linkages, we will then be able to assess the total cost that would be entailed in locating on the site and to compare those costs to the economic advantages that would be derived from the location.

In the next section we shall turn to other features of the site to analyze their effect on the site's development potential.
Its Accessibility: A Factor In Industrial Development

Its location at the entrance to the South East Expressway gives the site easy access to the central downtown business district, the airport, the South Boston industrial district, and the region in general. The location enables trucks to move directly from the site onto the expressway without necessitating their using local residential streets in the area.

The labor force may come to work by cars traveling to the site via the expressway (which ties in the ring of suburban communities), they may come by way of Massachusetts Avenue (which connects the Cambridge-M.I.T.-Harvard area) or they may approach the site from Washington Avenue (which provides access for the labor supply in the Roxbury community). In addition, a rapid transit stop (along the Orange line) is within a 15 minute walk of the site. The Orange line runs from Forest Hills, in Jamaica Plain, through Roxbury, downtown Boston and out to Everett (figure 11-2).

The site is, therefore, tied into a network of major streets, expressways, and rapid transit, that give it accessibility to a number of key points in the Metropolitan area. However, a disadvantage for the site is that while various transportational infrastructure is available, the quality of the facilities leaves much to be desired. For one thing, during peak hours, the streets and express-
Figure II - 2
Rapid Transit Network
way are congested. The congested conditions of the local streets in the area are due in part, according to the Boston Transportation Planning Review Report, to the high volume of cars traveling through the corridor into the central business district and to points beyond. Over 100,000 cars a day overflow onto the area's street, thus creating congestion for its local businesses and residents.

An arterial street has been proposed as an alternative to the now abandoned plans to build a freeway. The arterial will follow the path of the right-of-way. It is envisioned by BTPR as a means of relieving local street congestion. If such an arterial is built, it would run parallel to the site that we are examining. An issue that still has to be resolved is the capacity of the arterial.

The Southwest Corridor Coalition's position is that the road - if it is built at all - should induce no additional traffic. The objective would be to handle the present traffic more effectively and to create more attractive local development parcels between Roxbury Crossing and Jackson Square. The Coalition believes that a major factor that would keep the new arterial from becoming a major traffic generator would for it to begin at Jackson Square, rather than Forest Hill. In this configuration, it becomes a north-south replacement for Columbus Avenue and a few small streets in the east-west inner belt section.

The obvious relevance to the discussion here is that
the planned capacity of the arterial will determine its width and thereby affect the amount of public land that will be available for development. In our site layout, we have subscribed to the recommendations contained in the Southwest Corridor Coalition Report by allocating a 100 to 150 ft. wide strip for a possible arterial street. We share the sentiment of the local coalition that, should an arterial be built, the traffic generator effect should be no greater than it is now. Therefore, the future congestion of the area will be affected by the final plans that will be consummated with respect to arterial or other street patterns.

Thus, while the expressway and major streets provide access to such vital points as the airport, market, labor force, etc., when one considers the area's congestion these advantages cannot be listed without qualification. Street alignments, their capacity, functions, size, are planning issues that have yet to be resolved.

Also another set of unresolved planning issues that affect the site's potential concerns plans for rapid transit in the area. We noted earlier that the Orange line runs through a number of communities that give the site reasonable accessibility to a wide labor market. However, the rapid transit line is in extremely poor condition. Its ridership has been dropping drastically over the past few years.

The current proposal calls for relocating the Orange
line farther west to the corridor right-of-way, and to provide an extension of the Orange line along Blue Hill Avenue. The proposed relocation concerns this site analysis in two ways: For one thing, the proposed Blue Hill extension will be moving rapid transit service closer to the shifting inner city population, thereby providing better access to the site for the labor force in Roxbury and adjacent areas. Second, the site could serve as a location for a new transit station. There could be a stop on the Blue Hill extension that could serve the site. The location of a station on or near the site could have a tremendous impact on enhancing its commercial and industrial potential.

The development potential of rapid transit stops is pointed out in the South West Corridor Report as a means of starting "new-town in-town" projects:

...the demand for office and commercial space which could be induced by strategic placement of stations for a rapid transit line servicing corridor communities. Such inducement coupled with aggressive development of the right-of-way air rights and integrated planning could form the "economic" basis for a "new-town in-town" capable of attracting conventional private investment. 19

Careful transit node planning can serve a similar function in developing industrial/commercial clusters. In chapter three we shall analyze the development possibilities that would be offered by the location of a rapid transit stop on the site.

To summarize this section, the site is located at a
point that is near to a network of streets, expressway and rapid transit facilities, giving it access to a number of key points that are vital to industries. Upon closer examination, it must be admitted that the site is plagued by congested streets and expressways and that the transit facilities are in a serious state of disrepair. However, in looking to the future, we find a number of plans on the drawing board that will hopefully correct the major disabilities in the area. We also realize that, since these plans are in formative stages, the area has a real opportunity to influence these plans as it will be affected by them. This is especially true in respect to the location of rapid transit stations.
The Area's Physical and Social Image

Finally, we will examine the physical features of the site. Although this study did not involve itself in taking an inventory of the specific types of utilities on the site, we have assumed that, since the area has been a traditional location for industries and since heavy industries are currently located both on and near the site, that it is adequately equipped to accommodate the utility needs of the average industrial firm.

On the other hand, at a time when many industrial firms are seeking "campus" type locations that are found primarily along routes 128 and 495, this area, generally, in contrast, is physically depressing. The structures are old and dilapidated and have been worn from intensive use. The general unattractiveness of the environment will cause reluctance on the part of industrial firms to locate there. Morton Zuckerman points out that business firms like to be able to control their environment in order to prevent the value of their real estate from being adversely affected by their surroundings. 20

Another problem relevant to the area is the negative social image that the area has in the eyes of business. Many businessmen identify inner city communities as being socially unstable, poor labor markets and as places where vandalism and other crimes against private property run rampant. In fact, this image of inner city communities has such a strong hold on outside firms that many view
the effort to attract them into such an area as we are discussing here to be quite futile. Vandalism or the fear of it is indeed a concern that must be taken into consideration in the examination of alternative operational designs for the area. In other words, a high priority on security must be given, both in terms of the physical design of buildings as well as the operational design in terms of the kinds of security services that will be provided for the area.

To summarize this section, the area is most probably endowed with adequate utilities that have been the inheritance of many years of localized industrial activities. The same history of intensive industrial use has raped the area of its physical beauty. It is now a blighted and ugly place. Its unattractiveness along with the perception many outside businessmen have of the area as a place of high crime rate creates a negative image for the area, which makes it very difficult to attract "outside firms" to invest in the area.
Conditions and Prerequisites
Vital for Development

Based on the analyses that have been made in regards to land cost, cost of government services, the site's transportational facilities and its social and physical features, the following conditions have been determined as being vital to an effective industrial development project on the site:

Public Contribution of Land. Our calculations show that the cost for private land on the site is $2.65 sq. ft., while it drops to $1.90 sq. ft. if the public land is added at zero cost. Therefore, the first condition that we establish in the development of the site is that a substantial contribution of public land - at zero cost - will have to be made in order to bring the land cost down to a marketable level.

Cost of Government Services. Relative disadvantage of the city in delivering government services at a competitive cost is an issue that finds no consensus among experts. What is the "real" tax burden, for instance, on commercial real estate as opposed to the "official" version? We concluded, however, that the present assessing system has built-in flexibility that will make it possible to make the necessary adjustments to prevent property taxes from being prohibitive to
development. The condition that must be established is that some form of "lieu tax" arrangement will have to be worked out to enhance the site's development potential. We realize that such a mechanism is more instrumental in helping local marginal firms than in serving as an inducement for outside firms to come in.

**The Site's Accessibility.** We found that the site ties into a network of transportation facilities that connect it to locations important to industry. We also found these facilities are suffering from overuse and outmoded equipment. The site development plans must, therefore, be coordinated with the planned upgrading of rapid transit services and the provisions of new street alignments. The location of a transit station on the site could aid its commercial and industrial development.

**The Area's Physical and Social Image.** Although we assume that the area enjoys much of the infrastructure vital for industrial operation, its many years of intensive use have left the site blighted and physically unattractive. Besides, the image of the area includes perception of high crime and a risk for private investment.

Based on these findings two conditions must be established. First, the entire area surrounding the site
must be upgraded. This can best be done by EDIC authorizing a renewal zone and committing public resources to upgrading the area. Secondly, the site's security must be made an intimate part of planning its facility and services. In this way, through public resources and by developing security minded facilities and operations, firms may have more confidence in the area as a place to do business.
Footnotes Chapter 2


4. These estimates are based on information supplied by real estate brokers. However, what Hamer did not make clear is whether or not these estimates include land development cost. That is the cost of bringing on to the site utility lines that are vital to the operation of industrial firms (e.g. water, gas, sewage, electricity, etc.). If the land development cost is contained in the Hamer estimates, the cost differential between suburban land and central city's land is substantial. If Hamer's estimates do not include site development costs, the "real" cost differential is probably much less, since one may assume that land development cost in the city would be less (per unit of land), due to the existence of such infrastructure already on the site. We will not be able to completely assess the relative economic advantages or disadvantages of the site's location until we have completed our estimate of the total development cost required to erect industrial facilities and analyze the alternative operational designs in chapter three. We shall, therefore, defer a final judgement of this matter until we are able to analyze the "economics of agglomeration" which we shall discuss in the next chapter.


6. Although for the purpose of this analysis we are assuming that the public land will be available at zero cost, we realize, however, that it could conceivably be disposed of in ways other than that which is being discussed here. We will, therefore, discuss in chapter four the "opportunity cost" of the public land. That is, what will be the state's foregone income in transferring the land to local developers to be used for purposes that we are suggesting in this thesis and what will the returns on its "investment?"

7. Based on unofficial sources in the Boston's Assessor's Department, old manufacturing facilities are generally assessed at 50% of their market value.
Footnotes Chapter 2 (cont'd)

8. Information is based on an interview this writer had with Mr. Upton in March, 1973.


11. Note the "U" shape of the abatement applications curve. The number of applications declined from 1962 to 1965. Beginning in 1966, the number of applications has been increasing each year. The abatement curve coincides roughly with the property tax rate. The rates remained fairly constant (with slight "drops" in its '62 and '63 rates) from 1961 through 1964. Starting with 1965, it began to increase dramatically and as we have noted, the abatement application curve began to climb in 1966.

12. In the opinion of Dr. Gerald Bush, Executive Director of the Boston Department of Commerce and Manpower, his Department could work out with the Assessor's Department tax arrangements that would be competitive with surrounding communities. This comment was expressed by Dr. Bush during his participation on a panel that was conducted as part of a Seminar on Industrial Development during M.I.T. Independent Activities Period. He also pointed out that his Department would be very particular about the kinds of industries that it would support for such arrangements. The Department, for instance, is not interested in industries that pay low wages.

13. This information has been based on a panel discussion in which Mr. Wheeler participated as part of a seminar on Industrial Development, that was conducted during M.I.T.'s Independent Activities Period, in January, 1973.


15. BTPR, Ibid., page 1-91.

16. BTPR, Ibid., page 1-97.
Footnotes Chapter 2 (cont'd)

17. Information is based on an interview that this writer had with Charles Turner, Chairman of the Southwest Corridor Coalition.


20. This information has been based on a lecture which Mr. Zuckerman delivered as part of a seminar on Industrial Development that was held during M.I.T.'s Independent Activities Period.
Chapter Three

Introduction

The previous chapter assessed the site's general suitability for industrial development. This chapter shall now examine industrial uses on the site. It will, first, estimate the cost of developing the facilities and the means of financing the development (including the support of small firms). This chapter shall also identify "desirable" large industries. Their selection will be based on the development objectives that were established in chapter one. In addition, we will examine ways by which large "outside" firms might link with small local firms on the site. Finally, we will project gross rental costs for both large and small firms.
Space Distribution

In this chapter, we will be suggesting two alternative space distribution designs. One design will feature single level manufacturing structures; the other design will be for two-level facilities.

In both space distribution designs, 63% of the site will be covered by building structures --- 369,447 square feet of ground level manufacturing space --- with the rest of the space used for parking facilities and open space.

Boston's zoning law requires manufacturing firms to provide one parking space for every 1600 square feet of manufacturing building space. In other words, for one level structures, with 369,447 square feet, 237.7 parking spaces must be provided. Assuming that an average parking space is 307 square feet, 69,710 square feet (227.7 x 307 sq. ft.) of land will have to be reserved for parking facilities. Thus, a total of 439,157 square feet of land will be used for buildings and parking, leaving (out of a total of 583,676 sq. ft.) 144,519 square feet for open space. This is about 25% of the total area. The multiple level design, with twice the amount of floor space - 738,894 – requires doubling the parking area to 139,420 square feet, leaving 75,809 square feet for open space, or 14% of the total site area. (Fig. III-1).
Fig. III-1.
Space Distribution Summary

Single Level Design

Building Space covers 63.3% of total area.
Total floor space = 369,447 sq. ft.

Parking Space covers 11.9%.
Total space = 69,710 sq. ft.

Open Space covers 24.8%.
Total space = 144,519 sq. ft.

Two-Level Design

Building Space covers 63.3% of total area.
Total floor space = 738,894 sq. ft.

Parking Space covers 23.8%.
Total space = 75,809 sq. ft.

Open Space covers 12.9%.
Total space = 139,420 sq. ft.
Development Costs Analysis

For estimating construction costs, in addition to consulting with a number of experts in the field of development and real estate, we used two publications that specialize in construction cost projections. The Dodge Building Cost Calculator and Evaluation Guide furnishes gross construction cost information on various types of commercial and industrial buildings.\(^1\) For a building that has both industrial and office facilities, of masonry construction, with brick outer wall, reinforced concrete foundation, equipped with heating and air conditioning (gas or oil) and which is classified in the guide as "good quality" construction, the cost per square foot is $15.58\(^2\).

To construct 359,447 square feet of industrial space at $15.58 per square foot the cost would come to $5,600,195\(^3\).

We also use the Dodge Building Cost Calculator Guide for determining the cost to construct a loading dock on to the building. The Guide projected a cost of $5 per square foot or $50,000 for 10,000 square feet of dock with four foot high concrete walls.

For the more detailed factors, the Eastern edition of
the Building Cost File was used. The Building Cost File provides estimates on such things as landscaping, parking lot paving, utility installation, etc. Based on estimates drawn from the sources discussed above, we estimate a total construction cost, for a one level industrial structure, to be $6,281,362 (table III-1).

We estimate two level facilities to cost $12,172,407 (table III-2). We expect an indirect cost of $1,267,968 for the single level building and $2,560,900 for two level structures.

In both the multiple levels and the single levels the indirect cost has been calculated on the same basis. As enumerated in table III-1 and III-2, the following items are included in the indirect cost computation:

- **Tax**...Tax is based on what the current owners are being assessed. The tax estimate is probably too high since for the two years during construction, most of the land area will be clear.

- **Insurance**...EDIC's estimate of current insurance rates in this area. Again, this estimate is on the "high side" since the rate that we are using applies to completed and fully functioning commercial buildings.

- **Administrative Cost**...Is a contingency item. It includes such services as legal counsel, bond counsel (should we use municipal bonds)
Table III-1

Construction Costs for One Story Structure

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost/Sq. Ft.</th>
<th>Area Sq. Ft.</th>
<th>Type of Space</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Construction</td>
<td>15.58</td>
<td>359,447</td>
<td>Gross Floor Area</td>
<td>5,600,195.00</td>
</tr>
<tr>
<td>Soil Preparation</td>
<td>1.00</td>
<td>369,447</td>
<td>Building Area</td>
<td>369,447.00</td>
</tr>
<tr>
<td>Loading Dock</td>
<td>5.00</td>
<td>10,000</td>
<td>Dock</td>
<td>50,000.00</td>
</tr>
<tr>
<td>Levelers are optional, see below*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utility Installation</td>
<td>--</td>
<td>--</td>
<td></td>
<td>50,000.00</td>
</tr>
<tr>
<td>Parking Lot</td>
<td>2.00</td>
<td>69,710</td>
<td>Parking Area</td>
<td>139,420.00</td>
</tr>
<tr>
<td>Land Scaping</td>
<td>.50</td>
<td>144,519</td>
<td>Open Space</td>
<td>72,260.00</td>
</tr>
</tbody>
</table>

Total Construction Cost   6,281,362.00

Land Costs                1,108,984.00

7,390,346.00

Indirect Cost

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tax (2 x 66,000)</td>
<td>132,000.00</td>
</tr>
<tr>
<td>Insurance (.07 x 369,447) x 2 yrs.</td>
<td>51,724.00</td>
</tr>
<tr>
<td>Interest 8% x 2 = 8%</td>
<td>702,622.00</td>
</tr>
<tr>
<td>Administrative Cost</td>
<td>336,622.00</td>
</tr>
<tr>
<td>Brokerage Fee 5% of rental</td>
<td>45,000.00</td>
</tr>
</tbody>
</table>

Total Development Cost       8,658,314.00
Table III-1 (cont'd)

Annual Debt Costs for One Story Structure

<table>
<thead>
<tr>
<th>Interest</th>
<th>Constant Rates</th>
<th>Years</th>
<th>Annual Rental</th>
<th>Cost/Sq. Ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6%</td>
<td>8.62</td>
<td>20</td>
<td>$756,347.00</td>
<td>2.04</td>
</tr>
<tr>
<td>6%</td>
<td>7.75</td>
<td>25</td>
<td>671,020.00</td>
<td>1.82</td>
</tr>
</tbody>
</table>

Excluding Real Estate Taxes During Construction:

- 20 year term: 1.98/sq. ft.
- 25 year term: 1.79/sq. ft.

*Optional:

Heavy Duty Levelers

80,000 each (includes installation)

For two levelers, .03 cents would be added onto the rental cost per foot.
<table>
<thead>
<tr>
<th>Description</th>
<th>Cost/Sq.Ft.</th>
<th>x</th>
<th>Area</th>
<th>Type of Space</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Construction:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Ground Floor</td>
<td>15.58</td>
<td></td>
<td>349,447</td>
<td>Gross Floor Area</td>
<td>5,444,385.00</td>
</tr>
<tr>
<td>2. Second Floor</td>
<td>17.58</td>
<td></td>
<td>&quot;</td>
<td>&quot;</td>
<td>6,143,276.00</td>
</tr>
<tr>
<td>Soil Preparation</td>
<td>1.00</td>
<td></td>
<td>369,447</td>
<td>Building Area</td>
<td>369,447.00</td>
</tr>
<tr>
<td>Loading Dock</td>
<td>5.00</td>
<td></td>
<td>20,000</td>
<td>Dock Area</td>
<td>100,000.00</td>
</tr>
<tr>
<td>Levelers are optional*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freight Elevator</td>
<td>48,958.00</td>
<td>Each (including installation)</td>
<td></td>
<td>48,958.00</td>
<td></td>
</tr>
<tr>
<td>Utility Installation</td>
<td>1.00</td>
<td></td>
<td>369,447</td>
<td>Building Area</td>
<td>50,000.00</td>
</tr>
<tr>
<td>Parking Lot</td>
<td>2.00</td>
<td></td>
<td>139,420</td>
<td>Parking Area</td>
<td>278,840.00</td>
</tr>
<tr>
<td>Landscaping</td>
<td>.50</td>
<td></td>
<td>75,809</td>
<td>Open Space</td>
<td>37,905.00</td>
</tr>
<tr>
<td><strong>Total Construction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12,172,407.00</td>
</tr>
<tr>
<td><strong>Land Cost</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,108,984.00</td>
</tr>
<tr>
<td><strong>Total Development Cost</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13,281,391.00</td>
</tr>
</tbody>
</table>

**Indirect Cost**

- Tax (2 x 66,000)                        | 132,000.00  |
- Insurance (.07 x 738,894) x 2 yrs       | 103,448.00  |
- Interest 8% x 2 = 8%                     | 1,584,562.00|
- Administrative Costs                     | 673,890.00  |
- Brokerage Fee 5% of rental               | 67,000.00   |

**Total Indirect Cost:**                  | 2,560,900.00|
**Total Development Cost**                | 15,842,291.00|
Table III-2 (cont'd)

Annual Debt Cost for Two Level Structure

<table>
<thead>
<tr>
<th>Interest</th>
<th>Constant Rates</th>
<th>Years</th>
<th>Annual Rental</th>
<th>Cost/Sq. Ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6%</td>
<td>8.62</td>
<td>20</td>
<td>$1,365,606.00</td>
<td>1.83</td>
</tr>
<tr>
<td>6%</td>
<td>7.75</td>
<td>25</td>
<td>1,227,778.00</td>
<td>1.66</td>
</tr>
</tbody>
</table>

Excluding Property Tax During Construction

20 year term 1.82 sq. ft.
25 year term 1.64 sq. ft.

*Heavy duty levelers, $80,000 each (including installation)
will cost an extra .03 cents per foot on the annual rental.
architect fee, etc. This estimate may be slightly on the "low side."

Brokerage fee...The amount listed is the amount brokers generally charge.

Interim Construction...This would be interest on loans during construction. Based on conversations with people in the development field, 8% seems to be the current rate for interim construction financing.

The land cost, at $1.90 per square foot, is $1,108,984. (These costs are itemized in tables 111-1 and 111-2).

Thus, the total development cost for a single level structure is $8,658,314 and for two level structures, it comes to $15,842,291.

Of course, a crucial factor in the rental cost of industrial facilities is the method by which the facilities are financed. The next section will discuss industrial Revenue Bonds, a method of financing industrial buildings, which is used by many states, including Massachusetts.
Industrial Revenue Bonds

Municipal bonds provide the cheapest means of financing major developments of the kind we are discussing. This section will discuss the use of industrial revenue bonds and the roles that the Economic Development and Industrial Commission and the Internal Revenue Service might play in their application.

The attractive feature of Municipal bonds, which are securities issued by a state or local government, is that income earned from them (i.e. interest) is tax exempt. Since the purchase of Municipal bonds serves as a low risk tax shelter investment, commercial bankers and individuals in high tax brackets have been the major purchasers. In 1966, the U.S. Treasury reported that 40.3% of all outstanding Municipal bonds were owned by commercial banks and 38.2% were owned by individuals, followed by state and local governments having 4.6% of the total share and corporations with 4.1%. The low risk tax shelter feature has enabled state and local governments to secure financing for major projects at costs lower than conventional methods.

There are basically two types of Municipal bonds. General Obligation bonds and securities are issued by a government unit for which the "full faith and credit" of the jurisdiction is pledged. That is, the issuing Municipality pledges the revenue that is derived from its taxing power
to pay off the debt. The investor has recourse to the courts, in the event of default, to compel the issuer to raise tax revenue to fulfill its obligation.

Revenue bonds, on the other hand, are secured only by the facility for which they are issued and the facility must generate the necessary revenue for arresting the debt. Revenue bonds have been used to finance such income producing operations as parking garages, municipal sports facilities, tool facilities, etc. Industrial development bonds are a special version of revenue bonds. Industrial revenue bonds are issued by a government unit for the purpose of building commercial facilities that are then leased or sold to a private enterprise. Mississippi devised this scheme of municipal financing in 1936 for the purpose of attracting industry into the state.\textsuperscript{6}

In 1967, the state of Massachusetts enacted legislation aimed at aiding municipalities in their efforts to stimulate industrial development.\textsuperscript{7} The Massachusetts law authorizes local government units to establish local Industrial Development finance authorities. The local authorities have power to issue revenue bonds for financing industrial projects within their respective jurisdictions.

However, before a proposed project is eligible to receive the benefit of this particular financing mechanism, it must, in addition to getting approval by the local finance authority, receive a "Certificate of Convenience"
from the Department of Commerce and Development. An Industrial Finance Board has been established in the Department to review all certificate of convenience applications. Thus, projects seeking the use of the state IDFA bonds must be able to overcome bureaucratic hurdles at both the local and the state level.

In contrast, the legislatively enacted Boston Economic Development and Industrial Development Corporation's revenue bonds have been freed from the obstacles of state bureaucracy. As a home rule legislative package, state interference has been minimized and local flexibility has been maximized in the enacted law. This law specifically states: "Revenue bonds may be issued under the provision of this Act without obtaining the consent of any department, division, commission, board, bureau or agency of the commonwealth or of any political subdivision thereof and without any other proceedings or the happening of any other conditions or things other than those proceedings, conditions or things which are specifically required by this act." Another important difference is that while IDFA bonds are limited to strictly industrial projects, the Corporation's bonds have been broadened to include not only manufacturing but other types of commercial facilities within an industrial development project.

It should be noted here that while the Corporation revenue bonds appear to offer greater flexibility, there
is no provision in the law that prohibits the Corporation from using IDFA. IDFA bonds, thus, serve as an extra financing leverage to which the Corporation has access whenever such a need arises. For this purpose, Boston has formally created an Industrial Finance Authority with a board that consists of an "in-house" membership drawn from representatives of various city departments. 10

Of course, as with all forms of financing, interest rates on revenue bonds fluctuate with the state of the money market. Money supply, the amount of competition in the bond market, the credit rating of the issuer and the facility user and so forth are all factors that determine interest rates at any particular time. Currently, estimates of interest rates on revenue bonds fall in the range of 5 to 6 percent.

Based on a 6 percent interest cost, to finance single level structures, with a projected development cost of $8,658,314 with a twenty year term, the annual payment would be $756,347 or $2.04 sq. ft. If the terms are extended to 25 years, the annual debt service cost drops to $671,020 or $1.82 sq. ft. In contrast, for a two level facility, with the same interest rate, for a term of twenty years, the annual rental is $1,365,606 or $1.83 per square foot; for a twenty five year term the cost drops to $1.66 sq. ft. with an annual debt service cost of $1,227.778. (tables 111-1, 111-2).

However, industrial revenue bonds have two major
constraints on their use. First of all, for interest earned on issues that exceed $1 million to be tax exempt, they must meet the rigorous requirements that have been established by the Internal Revenue Service. Interest on Bonds, in addition to those that are $1 million or less, may retain tax exempt status if they are to be used for financing the construction of the following types of projects:

1. Housing development
2. Sports facilities
3. Convention or trade show facilities
4. Airports, docks, wharves, rapid transit and storage facilities
5. Public utilities
6. Air or Water Pollution control facilities
7. Water works

Bonds that are used to finance the acquisition and development of land for an industrial park are also exempt. This provision does not include the construction of buildings on the site.

Alternatively, a government unit, for any particular issue, may choose to waive its rights to the maximum $1 million tax exempt bond and in its place elect the $5 million bond option. With this option, a government unit is allowed to issue, for a particular user, up to $5 million worth of tax exempt bonds, provided that the following conditions are met:
1. The principal user of the facility that is being financed by bond issue must not have made any capital expenditure within the jurisdiction of the issuing government unit up to three years prior to the issuing of the bonds.

2. The principal user must not be occupying other facilities within the jurisdiction of the issuing government unit for which tax exempt bonds have been issued within three years prior to the issuing of the bonds.

3. For a maximum of three years after the $5,000,000 tax exempt bonds have been issued, the principal user must not make additional capital expenditures within the jurisdiction of the issuing government unit.

The $5 million ceiling provides considerable flexibility for a firm. For example, company A is located in town Y and it spent $2,000,000 to expand its facility there. Two years later company A negotiates an agreement with town Y to lease from it a building which the town will build by selling industrial revenue bonds that cost $3,000,000. The $3,000,000 bonds would be eligible to receive tax exempt status on their interest because the principal user of the facility, company A, had spent only $2,000,000 in capital expenditure within three years prior to the bonds being issued. However, should company A decide to further expand its facility in town Y within three years after the bonds have been issued, it would not be eligible to use tax exempt bonds for such purpose because it had reached the maximum $5,000,000 capital expenditure. On the other hand, if company A decides to expand its facility in adjacent town Z, where it has not previously made such an investment, it would be eligible
for the full $5,000,000 exemption. Or, in the event
town Y is unincorporated, it would not have the authority
to issue the industrial revenue bonds, thus requiring the
county in which company A is located to issue the bonds.
In this situation the $5,000,000 ceiling would apply to
the entire county.

The implications of the Internal Revenue Service
restrictions are as follows: Since our development cost
projections exceed $5,000,000, the project must be planned
for multiple users. That is, it would not be possible
to finance either the single level facilities or the two
level facilities with the intent of leasing them to one
tenant. Rather both of the designs would have to
be broken up into smaller projects with each not exceeding
$5,000,000 in cost. For instance, the single level
structures that cost $8,658,314 could not be built as a
single project for one tenant. They would have to be broken
up into at least two projects with a different principal user for
each. The two level structures, costing $15,842,291,
would have to be divided into at least four or more
projects with an equal number of users. In addition, for
issues to be eligible for the full $5,000,000 exemption,
firms that will be the principal occupant for each project
must be able to meet the requirements that we previously
discussed.

The second major constraint on the use of industrial
revenue bonds is that, as we noted earlier, their issues
are secured by the lease of the building's tenant. Thus, the most important factor in successfully marketing industrial revenue bonds is the credit worthiness of the tenant.

If a firm's credit is weak, it is unlikely that the bonds would be marketable. In other words, municipal bonds generally serve as a form of secure, high yield, tax shelter investment for high income investors. Security Industry Association states: "In essence, money placed in Municipal bonds is money that would not be invested in 'risk' situations. The salesman who places municipal bonds in a customer's portfolio for protective purposes demonstrates a high degree of sophistication and develops a prestige with the customer because he knowingly minimizes 'risk' that might occur to a customer's portfolio in a market downtown." Thus, the nature of the bond market excludes the possibility of using industrial revenue bonds to finance facilities for industrial firms that are "start-ups" or those firms that are operating marginally.

In the next section, we will examine the various types of industries that are established in Boston and which would most probably be able to use industrial revenue bond financing. We will look at such factors as their employment size, the average amount of space per employee that firms in the various industrial categories require, their average wages, percentage of minority employment and so forth.
What Type of Industry?

We have concluded in the previous section that, if industrial revenue bonds were used exclusively to finance this project, it would mean that the site's development would be restricted to established firms with good financial track records in order to meet the stringent credit required to market the issues. We should hasten to add here that this study will not restrict itself to industrial revenue bonds. In a subsequent section other means of financing shall also be examined, which will enable the park to accommodate a "mix" of large and smaller local firms.

In this section, we will scan the standard industrial classification in order to determine the types of industries that will provide the largest employment with the highest wages for the minority labor force.

To aid our investigation at this stage, we shall draw upon information gathered by the Boston Economic Development and Industrial Commission in a survey that it completed in 1970. The Commission surveyed 309 industrial firms, out of a universe of 582 firms located in Boston.18 The firms that were interviewed were classified at the two digit level of the Standard Industrial Classification (SIC) code for manufacturing activities (numbers 19 through 39).

Only firms that employed twenty or more employees were included in the survey. We are assuming that among this group of firms will probably be the largest number of
firms that would be able to secure financing through industrial revenue bonds. The survey provided information on wages, minority participation, movement of supplies, geographical distribution of raw materials and sale, assessment of city services by industrial firms, average square feet of space per employee by industry and the relocating or expansion plans of firms.

First, on an aggregate level, the survey found that mean annual wages among all industrial categories in the sample range from $6,200 (apparel, leather, and paper) to $8,600 (Stone, Clay, Glass, Concrete). 19

The industries paying the highest average wages in the sample are:

<table>
<thead>
<tr>
<th>Industry</th>
<th>Average Wages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stone, Clay, Glass Concrete</td>
<td>$8,600</td>
</tr>
<tr>
<td>Fabricated Metal Products</td>
<td>8,000</td>
</tr>
<tr>
<td>Printing</td>
<td>7,600</td>
</tr>
<tr>
<td>Metal Machinery</td>
<td>7,600</td>
</tr>
<tr>
<td>Chemical</td>
<td>7,500</td>
</tr>
<tr>
<td>Primary Metals</td>
<td>7,500</td>
</tr>
</tbody>
</table>

Industries that have next to the lowest average wages in the sample are as follows:

<table>
<thead>
<tr>
<th>Industry</th>
<th>Average Wages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Machinery</td>
<td>7,300</td>
</tr>
<tr>
<td>Food</td>
<td>7,200</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>7,100</td>
</tr>
<tr>
<td>Furniture</td>
<td>7,100</td>
</tr>
<tr>
<td>Transportation Equipment</td>
<td>7,100</td>
</tr>
<tr>
<td>Wood Products</td>
<td>7,100</td>
</tr>
</tbody>
</table>
Industries with the lowest wages in the sample are:

<table>
<thead>
<tr>
<th>Industry</th>
<th>Average Wage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precision Instruments</td>
<td>6,800</td>
</tr>
<tr>
<td>Textile</td>
<td>6,700</td>
</tr>
<tr>
<td>Apparel</td>
<td>6,200</td>
</tr>
<tr>
<td>Leather</td>
<td>6,200</td>
</tr>
<tr>
<td>Paper</td>
<td>6,200</td>
</tr>
</tbody>
</table>

The above configurations provide a rough indication of the relative benefits of the various industrial categories in terms of the average wages that they pay. We should emphasize, however, that these wages should not be viewed in an absolute sense, but rather as a means for identifying industries that will most likely provide the highest paying jobs relative to other industries.

How many jobs will each of the above industries provide on the site? To derive a precise answer to that question requires an analytical process that extends far beyond the scope of this study. We would have to use much more disaggregated methods of analysis that analyze the labor demands of the various types of firms that fall within the broader industrial classification. We would also be required to examine intra-industrial labor and capital structures as well as external economic forces.

However, a less sophisticated approach to getting some idea of the job creation potential of the site is to examine the industries' current use of space per employee and to divide that number by the amount of floor space that will be offered by the site.

Fortunately, the survey provides information on the
Table III-3

Projected Employment Potential of the Site
(Projected Number of Employees that will be Accommodated by the Site)**

<table>
<thead>
<tr>
<th>Industry</th>
<th>Average Wages</th>
<th>Mean Sq.Ft. Per Employee by Industry*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Two levels</td>
</tr>
<tr>
<td><strong>Industries with High Average Wages:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stone, clay, glass, concrete</td>
<td>$8,600.00</td>
<td>1,500</td>
</tr>
<tr>
<td>Fabricated Metals</td>
<td>8,000.00</td>
<td>420</td>
</tr>
<tr>
<td>Printing</td>
<td>7,600.00</td>
<td>410</td>
</tr>
<tr>
<td>Metal Machinery</td>
<td>7,600.00</td>
<td>830</td>
</tr>
<tr>
<td>Chemical</td>
<td>7,500.00</td>
<td>380</td>
</tr>
<tr>
<td>Primary Metals</td>
<td>7,500.00</td>
<td>250</td>
</tr>
<tr>
<td><strong>Industries that have next to the lowest average wages:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical Machinery</td>
<td>7,300.00</td>
<td>380</td>
</tr>
<tr>
<td>Food</td>
<td>7,200.00</td>
<td>650</td>
</tr>
<tr>
<td>Misc.</td>
<td>7,100.00</td>
<td>690</td>
</tr>
<tr>
<td>Furniture</td>
<td>7,100.00</td>
<td>820</td>
</tr>
<tr>
<td>Transportation Equip.</td>
<td>7,100.00</td>
<td>1,300</td>
</tr>
<tr>
<td>Wood Products</td>
<td>7,000.00</td>
<td>1,000</td>
</tr>
<tr>
<td><strong>Lowest Average Wage Industry:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Precision Instruments</td>
<td>6,800.00</td>
<td>340</td>
</tr>
<tr>
<td>Textile</td>
<td>6,700.00</td>
<td>670</td>
</tr>
<tr>
<td>Apparel</td>
<td>6,200.00</td>
<td>370</td>
</tr>
<tr>
<td>Leather</td>
<td>6,200.00</td>
<td>400</td>
</tr>
<tr>
<td>Paper</td>
<td>6,200.00</td>
<td>710</td>
</tr>
</tbody>
</table>

**These projections have been calculated using the following formula:

\[
\text{Total Sq.Ft. of Floor Space on the Site} / \text{Mean Sq.Ft. of Floor Space per employee in use by each industry}
\]

mean square feet of manufacturing floor space per employee that the sample industries currently maintain.\textsuperscript{20}

Realizing the limitations, the "mean square feet per employee" data can provide a rough gauge for estimating the number of jobs that could be created on the site.

These estimates will suggest which industries will probably be able to provide the largest number of jobs relative to other industries.

We made the estimates in the following way:

1) First, we use information that EDIC acquired through its survey. As we noted above, the survey provided EDIC with the amount of space each industrial category uses per employee ("mean square feet per employee"). For instance, EDIC found that the Fabricated Metals industries use, on the average, 420 square feet of floor space per employee.

2) Next, we divide the "mean square" that is listed for each industry by the total square feet of floor space that will be created with the construction of the new facility; this gives us our projection by industry.

Primary metals industries seem to require the fewest square feet of space per employee (250 sq. ft.) and their average wages are among the highest ($7,500). Chemical industries also use relatively few square feet of space per employee (380 sq. ft.) and their average wages are $7,500.

Thus, based on the above projections outlined in table III-3, the site, with all single story structures,
could accommodate from 247 to 1,447 employees; with all two level structures the number of employees could range from 494 to 2,954.

How many minorities will be employed in the new facilities and what will their average wages be? That is indeed a vital question, since the purpose of this project, as described in chapter one, is to stimulate the local ghetto economy. To get at this question it would be enlightening to know the current level of minority participation in these industries. Table III-4 shows the percentage of minority employees in those industries paying an average wage of more than $5,000. Based on those percentages, a projection is made on how well minorities will fare in new jobs created on the site by industry. The projection has been made by taking the percentage of minority participation for each industry, multiplying that percentage times the number of jobs that are projected for that particular industry on the site, this will provide the "on site" projected minority participation by industry.

Table III-4 seems to indicate that, if all the industries in the sample follow the same hiring patterns, with the same hiring policies as those to which they have subscribed in the past, the industries that would employ the largest of minorities, earning $5,000 and over, would be industries having the lowest average wages. The dramatic exception to this conclusion is the primary metals industry which has reasonably high average
Table III- 4
Projection of Minority Participation

<table>
<thead>
<tr>
<th>Industry:</th>
<th>Percentage Employees that are both minority &amp; earn $5,000 and over by Industry* (Boston)</th>
<th>Projected number of minority employees that would be earning $5,000 and over on the site:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>two levels</td>
<td>one_level</td>
</tr>
<tr>
<td>High Average Wages</td>
<td>Stone, Clay, Glass, Concrete</td>
<td>1</td>
</tr>
<tr>
<td>Fabricated Metals</td>
<td>12</td>
<td>22</td>
</tr>
<tr>
<td>Printing</td>
<td>2</td>
<td>36</td>
</tr>
<tr>
<td>Metal Machinery</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Chemical</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Primary Metals</td>
<td>26</td>
<td>776</td>
</tr>
<tr>
<td>Industries with Next to lowest Average wages</td>
<td>Electrical Machinery</td>
<td>5</td>
</tr>
<tr>
<td>Food</td>
<td>11</td>
<td>124</td>
</tr>
<tr>
<td>Misc.</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>Furniture</td>
<td>8</td>
<td>72</td>
</tr>
<tr>
<td>Transportation Equipment</td>
<td>34</td>
<td>168</td>
</tr>
<tr>
<td>Wood Products</td>
<td>11</td>
<td>82</td>
</tr>
<tr>
<td>Industries with Lowest Average wages</td>
<td>Precision Instruments</td>
<td>7</td>
</tr>
<tr>
<td>Textile</td>
<td>166</td>
<td>83</td>
</tr>
<tr>
<td>Apparel</td>
<td>10</td>
<td>200</td>
</tr>
<tr>
<td>Leather</td>
<td>9</td>
<td>166</td>
</tr>
<tr>
<td>Paper</td>
<td>20</td>
<td>208</td>
</tr>
</tbody>
</table>

*This information is based on the survey of industrial firms in Boston conducted by the Boston Economic Development and Industrial Commission. Source: Boston's Jobs and Industry.
wages and yet which has a relatively high projected employment of 387 to 776 minority employees earning $5,000 or more on the site.

Five thousand dollars is not considered an adequate income, rather it serves as a minimum wage "bench mark." One would suspect that it represents the "Upper" level of the wage scale for industries having low average wages.

For instance, Table III-4 (Projection of Minority Participation) projects that the paper industry, if it was to have firms located in the new facilities, would employ 104 to 208 minorities earning in excess of $5,000. However, for the paper industry, $5,000 is 83% of its average wages of $6,200. In contrast, for the fabricated metals industry, $5,000 is only 62% of its average wages of $8,000. What these differences in percentages between the two industries seem to suggest is that the potential for earning beyond the $5,000 "bench mark" is much more substantial in the fabricated metal industry than it is in the paper industry. But the fabricated metal industry is projected to employ a maximum of only 22 minority workers earning $5,000 or more in contrast to the paper industry projection of 104 to 208 minority workers.

In chapter one we proposed that one of the goals in a community economic development program should be to develop meaningful job opportunities. We define "meaningful jobs" as those that paid adequate wages with built-in mobility. An industrial development strategy, therefore, should be
aimed at attracting the type of industries that have been identified earlier as having relatively high average wages and good internal mobility.

It seems clear, therefore, that firms will need to be encouraged and assisted in hiring minority people, especially firms in the high wage industries. On-the-job training money will need to be provided to hire minorities in positions in which they will be able to advance as they learn skills on the job. A strong minority hiring and training program is especially needed in order to make substantial breakthrough in the high wage industries. These are the industries in which minority workers are least represented and these are the industries that the site should attract. Regardless of the type of industries that will ultimately locate on the site, if the maximum impact on minority employment is to be derived from their presence, a coordinated manpower training program and an effective affirmative action policy that has federal and state "clouts" need to be planned along with the development of the project. We shall return to this issue in a subsequent section of this chapter when we discuss the development of a manpower training program as part of the operational design model for the site.

To summarize, this section has been addressing itself to the goal of providing meaningful jobs for the minority labor force. We discovered that industries having the most meaningful jobs in terms of their high average wages are industries that currently have the lowest minority
participation. We conclude therefore, that along with a strategy to attract high wage industries that provide maximum employment benefits, coordinated manpower training, recruitment and affirmative action programs will need to be developed that will enable minorities to enter and to advance within these industries.
Thus far, we have only dealt with one aspect of economic development - the employment aspect. Now we turn to the goal of providing opportunities for local enterprises.

This section will explore means of financing facilities for small locally owned manufacturing firms. For this purpose, we will turn to the Small Business Administration Local Development Company (LDC loan program popularly referred to as the "502" program). LDC's have been in existence for over twelve years and according to SBA, they have been responsible for $593 million of loans going to small businesses.21

Through this program, a business can receive up to $350,000 for financing capital improvements. The money can be used by a business to purchase land and to build commercial facilities. It also can be used to upgrade or to acquire capital inventories such as machines, business equipment or the installation of such items.

But before these benefits are available to a business, a local development company must first be formed. The company must be controlled by people who either live or do business in the community in which it is organized. It can be either profit or non-profit, but in either case, it must have a minimum of 25 stock holders or members.

The loan program is actually a three way arrangement
that involves SBA, banks and the LDC. First, an LDC is required to contribute from 10 to 20 percent equity money for each project. Then, SBA will participate with a bank(s) for financing the remaining 80 or 90 percent of the project cost. If the bank lends 40 percent or more of the total cost, SBA will guarantee 90 percent of the banks loans. SBA lends its share at 5 1/2 percent.

Since we have no way of knowing at this stage the scale at which SBA and the participating banks would be willing to participate in a project of this type, we have computed costs for projects that range in size from $1,980,286 to $4,329,157 and that would provide from 92,361 square feet to 184,723 square feet of space for small manufacturing firms.

Table III-5 illustrates how an LDC financed project would work. First of all, we derive the cost of small firm facilities by making it a ratio of the total development. For instance, if half the floor space in the one level structure is used to house small firms, the small firms share of the total development cost would be 50 percent or $4,329,157. Thus, $4,329,157 would provide for 184,723 square feet of one level manufacturing space for small firms.

In an LDC program, each small firm that uses the facilities would have to be designated and each of which would be lent up to $350,000. Thus, for a project that costs $4,329,157 thirteen small firms
Table III-5

One Level Facilities

50% of 369,447 = 184,723 sq. ft.
50% of $8,658,314.00 = $4,329,157.00

Number of Small Businesses = $4,329,157 \div 350,000 = 12.3 \text{ or } 13

Average Space per Business = 14,209.4 square feet

<table>
<thead>
<tr>
<th>Total Project Cost</th>
<th>4,329,157.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>20% Equity</td>
<td>-865,831.40</td>
</tr>
<tr>
<td>25% of 369,447</td>
<td>92,361.5</td>
</tr>
<tr>
<td>25% of $8,658,314.00</td>
<td>2,164,579.00</td>
</tr>
</tbody>
</table>

Debt Service Costs

| Bank - 7% - 20 years | $161,565.00 |
| SBA - 5 1/2% - 20 years | 143,382.00 |
| Cost/sq. ft. 1.64 | 304,947.00 |
| Bank - 7% - 25 years | 147,192.00 |
| SBA - 5 1/2% - 25 years | 127,970.00 |
| Cost/sq. ft. 1.45 | 275,162.00 |

25% of 369,447 = 92,361.5 sq. ft.
25% of $8,658,314.00 = $2,164,579.00

Number of small businesses = 2,164,579 \div 350,000 \approx 7

Average space per business = 13,194.5 sq. ft.

<table>
<thead>
<tr>
<th>Total Project Cost</th>
<th>2,164,579.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>20% Equity</td>
<td>-432,915.80</td>
</tr>
<tr>
<td>25% of 369,447</td>
<td>92,361.5</td>
</tr>
<tr>
<td>25% of $8,658,314.00</td>
<td>2,164,579.00</td>
</tr>
</tbody>
</table>

Debt Service Costs

| Bank - 7% - 20 years | $80,782.00 |
| SBA - 5 1/2% - 20 years | 71,691.00 |
| Cost/per foot 1.65 | 152,473.00 |
| Bank - 7% - 25 years | 74,028.00 |
| SBA - 5 1/2% - 25 years | 63,988.00 |
| Cost/per ft. 1.49 | $138,016.00 |
Table III-5 (cont'd)

**Two Level Facilities**

25% of 738,894 = 184,723 sq. ft.
25% of $15,842,291.00 = $3,960,572.00
$350,000 divided into 3,960,572 = 11.3 or 12

\[
\frac{184,723 \text{ sq. ft.}}{12 \text{ Businesses}} = 15,393.5 \text{ sq. ft. Each}
\]

<table>
<thead>
<tr>
<th>Total Project Cost</th>
<th>$3,960,572.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>20% Equity</td>
<td>$792,114.40</td>
</tr>
<tr>
<td>Loan Amount</td>
<td>$3,168,457.60</td>
</tr>
<tr>
<td>40% Bank Loan (90% Guaranteed SBA)</td>
<td>$1,584,228.80</td>
</tr>
<tr>
<td>40% SBA</td>
<td>$1,584,228.80</td>
</tr>
</tbody>
</table>

**Debt Services Costs**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank Payment - 7% - 20 years</td>
<td>$147,809.00</td>
</tr>
<tr>
<td>SBA - 5 1/2% - 20 years</td>
<td>$131,175.00</td>
</tr>
<tr>
<td>Cost per foot 1.50</td>
<td>$278,984.00</td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank Payment - 7% - 25 years</td>
<td>$134,160.00</td>
</tr>
<tr>
<td>SBA 5 1/2% - 25 years</td>
<td>$117,075.00</td>
</tr>
<tr>
<td>Cost per foot 1.36</td>
<td>$251,235.00</td>
</tr>
</tbody>
</table>

12 1/2% of 738,894 sq. ft. = 92,361.5
12 1/2% of $15,842,291.00 = $1,980,286

Number of small businesses \( \frac{1,980,286}{350,000} = 5.6 \) or 6

**Average 15,393.58 sq.ft./business**

<table>
<thead>
<tr>
<th>Total Project Cost</th>
<th>$1,980,286.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>20% Equity</td>
<td>$396,057.20</td>
</tr>
<tr>
<td>40% Bank Loan</td>
<td>$1,584,228.80</td>
</tr>
<tr>
<td>40% SBA</td>
<td>$792,114.40</td>
</tr>
</tbody>
</table>

**Debt Services Costs**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank Payment - 7% - 20 years</td>
<td>$73,905.00</td>
</tr>
<tr>
<td>SBA - 5 1/2% - 20 years</td>
<td>$65,587.00</td>
</tr>
<tr>
<td>1.50/sq. ft.</td>
<td>$139,492.00</td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank Payment - 7% - 25 years</td>
<td>$67,330.00</td>
</tr>
<tr>
<td>SBA - 5 1/2% - 25 years</td>
<td>$58,538.00</td>
</tr>
<tr>
<td>1.36/sq. ft.</td>
<td>$125,868.00</td>
</tr>
</tbody>
</table>
would have to participate in order to exhaust the full amount available (13 x $350,000). In this particular example, the average amount of space allotment per firm would be 14,209.4 square feet.

If the local development corporation contributes 20 percent equity to the project or $865,831.40, the remaining 80 percent would be divided evenly between the bank and SBA, with SBA guaranteeing 90 percent of the bank's loan. Under this arrangement, for a twenty year term, the annual debt service cost is $1.64 per square foot and $1.45 per square foot with a twenty five year term loan. In both the 20 year and the 25 year term the bank interest rate has been assumed to be 7 percent. We are using this rate because of SBA's 90 percent guarantee arrangement which would hopefully enable the project to get a favorable rate at favorable terms. It is possible for SBA to participate at a higher level - say 50 percent - but at this level the bank would not be able to receive the 90 percent guarantee on its share. For a bank loan to be guaranteed, it must be at least 40 percent of the total project cost. It should be noted here that for areas with high unemployment, the equity requirement is 10 percent as opposed to 20 percent. While the reduction of the equity base of this project will serve to increase the annual debt service cost, it may improve the prospect of it becoming a reality, i.e. An LDC is much more likely to be able to raise $200,000 than it is to raise $400,000.
To conclude this section, through the SBA's LDC program, it is indeed possible to provide facilities for small firms. Since this program provides lower finance cost, the annual debt service cost is also lower. Although the gross rental cost will be determined in a later section, it seems safe to say at this stage that, given the advantageous annual debt service cost, the gross rental will also be within an acceptable range. We realize, however, that the success of small firms is dependent upon the economic environment in which they operate. How will these firms fit into an industrial cluster? In the next section we will discuss a planned business environment in which we shall examine possible "linkages" between small and large firms located on the site.
Planned Economic Environment

Up to now, we have analyzed the cost of industrial facilities, both for large and small firms, and we have identified desirable industries. This section will discuss a model that can be used for developing an operational design for the site's industries.

The model will be based on linkages between medium or large size firms and small industrial enterprises. The idea is to find firms that will complement each other.

The key to the model will be to find one or two desirable firms that could serve as a base for attracting desirable firms. The kinds of firms that are desirable are firms that pay high wages and have long internal career ladders. By "jobs with long internal career ladders", we are talking about jobs that enable a worker to enter at a relatively low skill level and to be able to move progressively upward in terms of responsibilities and earnings as he/she develops his/her skills on the job.

We noted in chapter two that an iron foundry is presently located on the site. Foundries tend to belong to high wage industries and, furthermore, as we discovered in an earlier section, primary metal industries are one of the few high wage industries that employ a substantial number of minority workers. Therefore, the foundry that is already on the site would be an excellent candidate as a base firm.

Therefore, one approach to implementing this model design would be to identify another firm that would be able to trade with the foundry that is presently on the site.
However, this design would be contingent upon the willingness of the indigenous firm to substantially upgrade its facility in order to enhance the overall quality and value of the environment. It might either receive financing through the SBA's LDC program or by selling industrial revenue bonds.

With the prospect of the general area being upgraded, along with the prospect of its properties increasing in value, getting the cooperation of the indigenous foundry should be a realistic expectation. An alternative plan would be to acquire the property, develop it and lease or sell it back to the foundry.

The largest portion of the relocation budget would be spent in relocating the foundry. Elimination of that high expense item will serve to reduce the overall land cost even lower than our estimates in chapter two.

The size of the firms is also a factor in development planning. For instance, it would be desirable to have at least one large firm on the site. A large firm might be encouraged to subcontract many of its operations to smaller firms which could also be located on the site. With a large outside firm on the site, financing facilities for small firms might be secured at a lower rate with longer terms. Moreover, such firms would probably enhance the value of property. This is not to say that a large firm is all good; an earlier section dramatically illustrates the low level of participation of the minority
labor force in high wage industries. As long as this practice continues, the existence of large firms in the community will continue to result in a disproportionate amount of money flowing out of the community. But by planning an effective manpower program, we hope that this factor will be reduced.

An example of a "small-large" firm linkage would be a large size operation that produces electrical machinery and a small electronic assembly firm that could be contracted by the larger firm to assemble certain specialized parts. Another example would be a machine shop which could do job work for, say, a large foundry or a fabricated metal factory. e.g. produce a special kind of machine tool or provide maintenance parts replacement service (a "backward linkage"). The small firm, of course, should not restrict itself to merely catering to the needs of its large neighbor on the site; it would be wise for it to seek out additional contracts from other sources. Perhaps it should not depend on more than 25 percent of its sales coming from any single source.

The major advantage that such linkages have for a large firm are that they provide greater operational flexibility, the convenience of having a subcontractor within easy access, and reduced transportation cost. The small firms could well serve a "greenhouse" function in that they will be training workers in entry level skills who could later advance to more sophisticated skill
development through employment with the larger firm. In this way, steps will have been built in a career ladder connecting smaller operations with the larger firms.

The second category of firms that could fit into the proposed park complex would be various enterprises that offer specialized services to businesses.

There are some serious questions whether businesses in the Dudley station area could survive if a new Orange line was to be built. Even if the present elevated facility is retained in addition to a new branch, the chances are the new line will attract the development of business districts that would be more central to the shifting population. The Southwest Corridor Coalition's report suggests that should the Orange line be relocated west along the corridor, the move could cause many of the marginal businesses in the Dudley Station area to fold. One implication of this possibility is that, in order for many of the existing businesses to survive, they will need to find a more conducive environment in which to relocate. The proposed industrial site might well serve as an alternative for a small number of special types of businesses, e.g. accounting, architects, and other such enterprises that provide services to business establishments. The advantage of the park is that they would have good access to their clients either by way of the South East Expressway, Massachusetts Avenue or the rapid transit line. They will also be able to service their neighboring tenants in the park and therefore enhance the attractiveness
of the park by providing the tenants with easy access
to vitally needed services. On the other hand, the park's
environment will enhance the business image of the small
struggling firms and it will, therefore, enable them to
more effectively appeal to prospective clients. In a
Directory of Black Businesses and Professionals published
by the Roxbury Businessmen's Development Corporation, over
ten different categories of business services offered by
Black owned businesses are listed. They include:

1) Accountants  6) Locksmiths
2) Advertising  7) Office Supplies
3) Consultants  8) Offset Printing
4) Security  9) Commercial Artists
5) Insurance  10) Computer Services

The park would offer the advantage of having consumers
of particular services being located in a central location.
The need here, in terms of selecting the particular firms
and the kinds of services that would be most compatible
to the complex, would be to conduct more exhaustive studies
of the services that would have the greatest demand. The
demand factor will depend on the nature of the industries
that will be attracted. Another factor that must be
carefully scrutinized is the capacity of the particular
firms considered to deliver quality and competitive
services, and this is very sensitive to how businesses are
organized.

The third category of functions would be to seek out
public institutions and private agencies that could service
the manpower needs of the park's tenants. A non-profit
employment agency will be needed to assure the various businesses of an adequate source of employees from the community. Opportunities Industrialization Center could operate a training center within the park complex, fitting their skill development program to the needs of the firms. This service could give a decided advantage to small firms that have limited money for training their employees. OIC will be training manpower at the operational level, developing their basic skills as well as training them for particular functions. Of course, financing for such OIC operation would be necessary.

The second level of manpower development could be provided by Circle, through the conducting of management training programs. The management training program, again, will be most advantageous for small firms which would not have the financial resources to sponsor such training on their own. The on-site location of both levels of training facilities could add to their effectiveness because training programs and curriculum could be shaped around the particular jobs of the trainees. By their central location, those who need such developmental training will have easier access.

Finally, the fourth function that will provide business opportunities will be direct services to people who will be using the park. The park, upon completion, will accommodate a minimum of one thousand employees in addition to the volume of traffic flow attracted to the area for
the purpose of conducting business transaction. In addition, should a rapid transit stop be located on or near the site, the potential for commercial development would be tremendous. Given this volume, the park could support a restaurant or lounge, service station, a bank branch (Unity bank), novelty shop, etc. A community bank such as Unity could "capture" some of the money that would normally escape the community via "outsiders" operating in the new facilities.
Total Rental Costs

Now that we have examined the various types of structures and alternative financing methods and now that we have some idea of what types of industries should go on the site—both large and small—we will now compute the gross rental costs for each of the above alternatives. The gross rental costs per square foot are as follows:

Firms Financed with Industrial Revenue Bonds

<table>
<thead>
<tr>
<th>Single level Structure</th>
<th>Two levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 year finance terms</td>
<td>20 year term</td>
</tr>
<tr>
<td>Insurance</td>
<td>Insurance</td>
</tr>
<tr>
<td>Management</td>
<td>Management</td>
</tr>
<tr>
<td>Outside Maintenance</td>
<td>Outside Maintenance</td>
</tr>
<tr>
<td>5% Vacancy</td>
<td>5% Vacancy</td>
</tr>
<tr>
<td>Real Estate Tax</td>
<td>Real Estate Tax</td>
</tr>
<tr>
<td>20 year finance terms</td>
<td>20 year term</td>
</tr>
<tr>
<td>Insurance</td>
<td>Insurance</td>
</tr>
<tr>
<td>Management</td>
<td>Management</td>
</tr>
<tr>
<td>Outside Maintenance</td>
<td>Outside Maintenance</td>
</tr>
<tr>
<td>5% Vacancy</td>
<td>5% Vacancy</td>
</tr>
<tr>
<td>Real Estate Tax</td>
<td>Real Estate Tax</td>
</tr>
</tbody>
</table>

| 20 year finance terms          | 20 year term        |
| Insurance                      | Insurance           |
| Management                     | Management          |
| Outside Maintenance            | Outside Maintenance |
| 5% Vacancy                     | 5% Vacancy          |
| Real Estate Tax                | Real Estate Tax     |

| 25 year finance terms          | 25 year term        |
| Insurance                      | Insurance           |
| Management                     | Management          |
| Outside Maintenance            | Outside Maintenance |
| 5% Vacancy                     | 5% Vacancy          |
| 20% Real Estate Tax            | Real Estate Tax     |

| 25 year finance terms          | 25 year term        |
| Insurance                      | Insurance           |
| Management                     | Management          |
| Outside Maintenance            | Outside Maintenance |
| 5% Vacancy                     | 5% Vacancy          |
| 20% Real Estate Tax            | Real Estate Tax     |
Building Financed Through the LDC Program

<table>
<thead>
<tr>
<th>Single Level</th>
<th>Two Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 year term 1.64</td>
<td>20 year term 1.50</td>
</tr>
<tr>
<td>Insurance .08</td>
<td>Insurance 09</td>
</tr>
<tr>
<td>Management .10</td>
<td>Management 10</td>
</tr>
<tr>
<td>Outside Maintenance .09</td>
<td>Outside Mainten-</td>
</tr>
<tr>
<td></td>
<td>ance 08</td>
</tr>
<tr>
<td>1.91</td>
<td>1.77</td>
</tr>
<tr>
<td>5% Vacancy 9.90</td>
<td>5% Vacancy 9</td>
</tr>
<tr>
<td>2.00</td>
<td>1.86</td>
</tr>
<tr>
<td>20% Real Estate Tax .40</td>
<td>Real Estate Tax 38</td>
</tr>
<tr>
<td>2.40</td>
<td>2.24</td>
</tr>
<tr>
<td>25 year term 1.45</td>
<td>25 year term 1.36</td>
</tr>
<tr>
<td>Insurance 08</td>
<td>Insurance 09</td>
</tr>
<tr>
<td>Management 10</td>
<td>Management 10</td>
</tr>
<tr>
<td>Outside Maintenance 09</td>
<td>Outside Mainten-</td>
</tr>
<tr>
<td>1.72</td>
<td>ance 1.64</td>
</tr>
<tr>
<td>1.81</td>
<td>5% Vacancy 08</td>
</tr>
<tr>
<td>2.17</td>
<td>1.72</td>
</tr>
<tr>
<td>20% Real Estate Tax 36</td>
<td>Real Estate Tax 34</td>
</tr>
<tr>
<td>2.06</td>
<td></td>
</tr>
</tbody>
</table>

Obviously, the long term finance arrangements provide more attractive rentals for both types of projects.

Commercial real estate brokers indicate that rental for new industrial facilities in the city, excluding property tax, cost about $2.00 to $2.25 per square foot. This cost would be for brick buildings without air conditioning. In all of the estimates that we have made, the net rental cost will be less than $2.25 per square foot, with buildings equipped with air conditioning. The property tax has been computed on the basis of a 5% annual rate at 50% of the properties assessed market value. Thus, for all the structures, including all of the financing alternatives, the gross rental costs range from $2.06 to $3.00 per square foot.
However, the gross rental costs, as listed above, do not reveal a complete analysis. They do not reflect, for instance, the economic benefits that will be derived from the operational design model which we described in an earlier section (Planned Economic Environment). In other words, to what extent will the operating costs of the site's occupants be reduced if industries and supportive services were to be selected in a way that would maximize their economic linkages with each other? The economic effect of businesses that are clustered spatially that result in the reduction of their per unit cost is referred to as "agglomeration economies".

Bergsman identifies two types of agglomeration economies: \(^{27}\) The clustering of several industries engaged in the same activities is called localisation economies. \(^{28}\) The fur industries in New York is an example of localisation clustering. The second type is characterized by a mixture of industries that are located around a particular service center, Urbanisation economies. \(^{29}\) Cities, for instance, provide a source of labor supply for industries that cluster around them. Another form of "Urbanisation economies" is when industries are clustered along the line of "input-output" flow. The Petro-chemical industries are examples of such clustering.

Students of economics see agglomeration economies as being major forces in structuring local and regional economies. In fact, Bennett Harrison suggests that:

"It may well be the case that depressed urban areas differ systematically from more developed urban areas by the extent to which they are unable to exploit agglomeration economies." \(^{30}\)
The operational model which we discussed in a previous section (Planned Economic Environment) falls into the category of an urbanisation cluster in that it proposes the establishment on the site of services that various industries located on the site may use (i.e. employment office and manpower training programs). The design also proposes that industrial firms should be selected in a way that will enable them to create backward and forward linkages within the cluster.

Therefore, through careful planning of "on-site" services and careful selection of industries that will fit into the planned cluster, the per unit overhead cost could be reduced to the firms in the cluster. Of course, the specific areas of cost reduction will be determined by the nature of activities of the selected firms.

For the purpose of example, let us assume that foundry A, at certain cycles in its business operations, requires the services of a machine shop. Since no machine shop is located nearby, it suffers the inconveniences, the transportation costs, the loss of operating efficiencies, by having to use the services of a machine shop that is located out of the area. Foundry A, therefore, decides to make the capital investment in the purchase of a machine shop, including equipment and facilities. Not only that, it has to hire a labor force, which it has to maintain during "slack" periods in its operation.

On the other hand, if foundry A had been part of a cluster plan, as we have proposed in our model, and one facet of the plan was to locate a machine shop near the
foundry, it would be able to save on transportation cost and to enjoy the convenience and efficiency of a service located next door while, at the same time, not having to make capital investments or to maintain a labor force during times of business slack. The above is only one illustration of the economic potential of clustering industries and services to maximize agglomeration economics forces.

Table III-6 below illustrates the savings in transportation costs that may be realized by a primary Iron and Steel Industry locating on a site that already contained the top wage industries that we identified earlier. The figures are derived from a national input-output table. The table indicates that 23% of the iron and steel industry inputs come from these six top wage industries and that primary iron and steel spends 22% of its total transportation expenses toward importing products from the above industries. Therefore, if a cluster was designed to contain all seven groups, the primary iron and steel industry, based on the national input-output table, could potentially have its transportation costs reduced by 22%. The above is only one example of one industry in respect to a particular expense item. But it illustrates the potential that clustering industries holds for reducing operating costs.

The gross rental cost must, therefore, be viewed against the economic advantages that may be derived from agglomeration economic factors. The stronger the linkages that are created within the cluster, the more each industry will be able to reduce transportation cost (and possibly other costs as well).
Table III-6

Primary Iron and Steel Transportation Costs of Transporting the Inputs from the Six Top Wage Industries

<table>
<thead>
<tr>
<th>Supplying Industry</th>
<th>Transportation Cost (thousand)</th>
<th>Total Input Cost (thousand)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stone, clay, glass</td>
<td>4476</td>
<td>33448</td>
</tr>
<tr>
<td>Fabricated Metals</td>
<td>1883</td>
<td>363027</td>
</tr>
<tr>
<td>Printing</td>
<td>60</td>
<td>1810</td>
</tr>
<tr>
<td>Metalworking Machine</td>
<td>55</td>
<td>11180</td>
</tr>
<tr>
<td>Chemical</td>
<td>19661</td>
<td>411586</td>
</tr>
<tr>
<td>Primary Iron and Steel</td>
<td>218265</td>
<td>4896536</td>
</tr>
<tr>
<td><strong>Total Transportation Cost</strong></td>
<td><strong>244400</strong></td>
<td><strong>Total Input of Top Six Industries</strong></td>
</tr>
<tr>
<td><strong>Total Transportation costs of all inputs</strong></td>
<td><strong>1083071</strong></td>
<td><strong>Total Input of All Industries</strong></td>
</tr>
</tbody>
</table>

Total input costs paid out to the top six industries = \( \frac{5717587}{24179057} \) = 23%

Total cost of inputs of all industries = \( \frac{24179057}{24179057} \) = 100%

Total costs of transporting the inputs for the top six industries = 244400 = 22%

Total transportation costs of all inputs = 1083071 = 22%
Footnotes—Chapter Three


2. The cost estimates that are provided in the Guide are based on prices that contractors charged for actual work performed. A multiplier is provided by the Guide to adjust cost estimates to local markets. Thus, the listed price in the publication is $12.50, but by applying the multiplier for the Boston area, the adjusted cost becomes $15.58.

3. In this calculation, 10,000 square feet have been subtracted from the original 369,447 square feet allotted for building area. The 10,000 square feet will be used for loading dock structure.


9. Ibid., Section 12, Revenue Bonds, page 1103.

10. This is information that was revealed by Mr. Bush during his participation in an M.I.T. Independent Activities Period Seminar on Industrial Development, January, 1973.


12. Ibid., Section 947.014.
Footnotes—Chapter Three (cont'd)

13. Ibid., Section 947.015.
14. Ibid., Section 947.0157.
15. Ibid., Section 947.0157.
17. This does not preclude the "mixing" in an industrial park of established "credit worthy" companies with "new start up" businesses.
19. Ibid., Table 2, "A Composite View of Boston's Manufacturing by Industry".
20. There are serious limitations to this procedure. For one thing, it makes no allowance for the possibility of increased efficiency in the use of space within the planned park. In other words, some firms may simply use their space more efficiently than others. For instance, the survey data suggests that smaller firms, so ideally we should adjust for size.
22. Ibid., page 46.
26. Ibid., page 263.
27. Ibid., page 263.
Chapter Four

"Wrap-Up"

To summarize, we have attempted to present a complete picture of the site's strengths and weaknesses. We established, in chapter two, conditions that, in our opinion, should be met if the full development potential of the site is to be achieved, namely, that both the state and local governments must provide support through land subsidy, tax write down, and by assembling the land through eminent domain. Secondly, the transportation facilities in the area must be upgraded.

In chapter three, we narrowed our observations to the more intricate aspects of industrial development. We determined that through a combination of industrial revenue bonds and the Small Business Administration LDC's financing that it will be economically feasible to construct facilities that will accommodate both large and small firms. We also identified what we considered as desireable industries to have on the site. Furthermore, we have designed an operational model which will function to link large firms with small enterprises. We have also
suggested that these linkages, by maximizing agglomeration economic factors, will function to reduce operating costs of the site's occupants. Thus far, we have met two of our objectives: By locating large high wage firms on the site, along with the implementation of a manpower development and effective minority hiring program, the Project will be able to provide meaningful employment for the Roxbury minority labor force. By developing a means of financing facilities for small local firms and by developing an operational design model in which they will be "linked" with larger firms on the site, we have also provided opportunities for local entrepreneurs.
"Start-Up"

How will the project get started? Three major actors will be involved in the development of this project. First of all, the State will be expected to transfer 160,000 square feet of "right of way" land to the developer of this project. Although we are proposing that the transfer be made at zero cost, there is still an opportunity cost factor that we must take into consideration. In other words, what will it be costing the State in "foregone income" to make a zero cost transfer? The State could possibly sell the land for $2.65 per square foot; this, of course, is assuming that our estimates of the market value of the private land are correct. If the State chose to sell the land at $2.65, it would receive $424,000 income from the transaction. In other words, the opportunity cost to the State, if it transferred the land to the project developer at zero cost, is $424,000.

What will the State receive in return for its "investment"? First of all, the state's contribution could contribute toward the development of taxable income properties with values ranging from $8,658,314 to $15,842,291.
Massachusetts will probably be contributing toward the creation or containment of a minimum of 247 to a maximum of 2,954 jobs. (See Table III-3). In addition, minimally, the site is projected to employ at least 383 minority workers who hopefully will be earning at least $5,000 annually. Minority employment will depend very heavily on the development of an effective minority hiring program; and that will be determined greatly by who the developer will be. Furthermore, the site will be accommodating industries with average wages in the range of $7,500 to $8,600.

The second participant in the site's development would be the Boston Department of Commerce and Manpower. The Economic Development and Industrial Commission and the Economic Development Industrial Corporation, and the Office of Manpower Planning are all part of this Department. Throughout our discussion, we have been making references to the Economic Development and Industrial Corporation, which is the city agency authorized by state legislation to use eminent domain power to acquire private industrial land. EDIC's role would be to acquire the land. It also,
as we have previously stated, has power to issue industrial revenue bonds. EDIC would, therefore, be the agency to acquire the land, issue industrial revenue bonds and to designate the developer.

We have also proposed that Circle should be authorized as the site's developer. The suggestion is made for the following reasons:

1. First of all, Circle is an agency established in Roxbury that is working there to stimulate economic development. This is a vital role and Circle, as an indigenous institution, with a "constituency" in the community should be strengthened. Besides, Circle could tie the development of this project into the broader development goals that it is pursuing. By Circle acquiring assists of the size and type that we speak of in this thesis, its leverage for securing financing for other projects would be strengthened tremendously.

   However, it would be advisable for Circle to not become the developer directly, but to form a subsidiary, with it holding the majority
share of the ownership. In this way, the developer would have greater operational flexibility and would hopefully be able to make more effective decisions.

It would be extremely advantageous to the project, if this proposed Circle subsidiary could engage a prestigious developer in a partnership arrangement. Such an arrangement would be advantageous in two ways. For one thing, the partnership would provide training for the newly formed development subsidiary that will help if to avoid costly and perhaps fatal mistakes. The second reason is that "hooking up" with a prestigious development firm with a good track record will serve to reduce the financing cost. Banks are more inclined to offer low interest loans with longer terms if they have confidence in the developer.
2. Secondly, Circle meets SBA's requirement as an LDC which means that it will be able to use the financing mechanism that we discussed in Chapter Three to construct facilities for small firms.

To conclude, we have attempted in this work to take a thorough look at the potentials of a proposed industrial park in the Southwest Corridor. In our opinion, this project has the potential of strengthening the social and economic institutions of the Roxbury community. This project could well serve as a national demonstration of community development.